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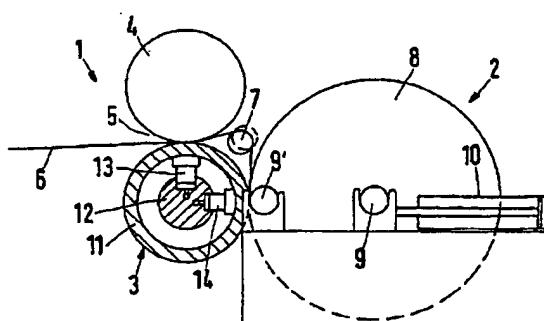
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An examination request pursuant to § 44 of the German Patent Law (PatG) has been filed.

[54] Calander and winder located downstream therefrom.

[57] A winder (2) is located downstream from a calander (1). The carrier drum (3) of the winder forms the fixed roller (1). This translates into a reduction of the space needed and into cost savings.



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The information presented below was taken from the documentation submitted by the applicant.

### Description

The invention relates to a calander comprising a fixed roller and at least one more roller for purposes of treating a sheet of material as well as a winder located downstream therefrom, which has a carrier drum for a lap to be wound onto a cylinder.

Such arrangements are found in installations where paper is manufactured or subsequently finished as well as in installations where plastic films are produced or else in installations that are used to treat other sheets of material. In all of these cases, the calander and the winder are units that are separate from each other, thus requiring a certain amount of space and a free sheet material length corresponding to the distance of said units from each other. Examples of calanders are all roller machines that treat the sheet of material by pressing it such as, for instance, super calanders, compact calanders or smoothing calanders.

The term "cylinder" is a general term for all types of winding cores or winding tubes of the sort that can be used for the wound laps in question here.

The invention has the objective of providing an arrangement consisting of a calander and a winder of the above-mentioned type which requires less space.

This objective is achieved in that the carrier drum constitutes the fixed roller of the calander.

This combination translates into considerable space savings. Eliminating one roller reduces costs. The free sheet material length, which often leads to difficulties, can be reduced to a minimum. The driven carrier drum can be employed as a driven fixed roller because neither one alters its position during the operating state.

There are several preferred possibilities for the configuration. For instance, the carrier drum can be arranged at the end of a calander roller stack. The carrier drum can form one of the two rollers of a compact calander. The carrier drum can form a gap with each of at least two rollers arranged offset on the circumference.

It is particularly advantageous for the cylinder to be arranged at the side of the calander. The weight, which rises as the diameter of the wound lap increases, does not have a detrimental effect on the carrier drum, as a consequence of which its calandering

function is not impaired either. Moreover, the completed wound lap can then be transported away by a crane or the like without any problems.

It is advantageous for the calander roller that interacts with the carrier drum to be arranged at the side of the carrier drum that lies opposite from the cylinder. The two functions, namely, calandering and winding, are clearly separate from each other. There is sufficient free space in between to allow other measures.

This is particularly the case when the cylinder is arranged at one side and the above-mentioned calander roller is arranged at the opposite side of the carrier drum. With such an arrangement, there is room above the carrier drum for the mechanisms that are commonly employed to automatically change the cylinder, as is necessary for continuous winding operations, as well as room for a crane to feed the empty tubes and to take away the full wound laps.

In another advantageous solution, the calander roller that interacts with the carrier drum is positioned on the carrier drum in such a way that it is offset by about  $90^\circ$  with respect to the cylinder. Here, too, the two functions are still sufficiently separated from each other.

It is very advantageous for the carrier drum to be a bending-setting roller. This is not only advantageous in order to set the desired line pressure during calandering but also to correct the contact pressure on the roll during winding in such a way as to produce a roll having a uniform hardness.

For this purpose, in a preferred embodiment, care is taken to ensure that the bending-setting roller has two rows of hydrostatic support elements, one of which faces the cylinder while the other faces the adjacent calander roller. If the support rows are offset with respect to each other by  $90^\circ$ , the setting envisaged for the calandering procedure and the setting envisaged for the winding can be selected independently of each other.

In a practical manner, the wound lap can be pressed against the carrier drum by means of a pressing device. In this way, a basic contact force can be exerted in order to attain the desired hardness.

In another embodiment of the invention, the cylinder has its own drive that keeps the rotational speed of the wound lap somewhat higher than the rotational speed of the carrier

drum, as a result of which the sheet of material is wound up at a predefined tension. This can likewise be used to influence the hardness.

It is also advantageous for an expander roller to be arranged between the last calander gap and the starting point of the sheet onto the wound lap. Even in the case of a small free sheet material length, there is still room to install such an expander roller which, in turn, ensures that a flawless wound lap profile is attained.

The invention will be explained in greater detail below with reference to an embodiment shown in the drawing. The following are shown in a schematic representation of an arrangement according to the invention:

Figure 1 – a compact calander;

Figure 2 – a super calander;

Figure 3 – a calander with horizontally adjacent rollers;

Figure 4 – a calander with two individual gaps offset in the circumferential direction;

Figure 5 – a calander with a roller stack.

The embodiment according to Figure 1 comprises a calander 1 and a winder 2 configured in the form of a so-called "Pope roller". The fixed roller of calander 1 is formed by a carrier drum 3 of the winder. The carrier drum 3 interacts with another calander roller 4 so as to form a gap 5 in which a paper sheet 6 is treated in order to impart it with certain properties such as smoothness, gloss, thickness and the like. The sheet 6 is fed over an expander roller 7 and then wound up to form a wound lap 8 that is created around a cylinder 9 or around a winding tube. Since the diameter of the wound lap 8 increases in size, the cylinder moves from its initial position 9' all the way to a final position 9. In this process, the cylinder is under the influence of a pressing device 10, here a pneumatic or hydraulic piston-cylinder arrangement, that presses the wound lap at a predetermined force against the carrier drum 3, thereby imparting a predefined hardness to the wound lap.

The carrier drum 3 is configured as a bending-setting roller having a jacket 11 that can be rotated around a non-rotatably mounted carrier 12 that can be radially stressed by means of two rows of hydrostatic support elements 13 and 14. By regulating the support elements 13 zonewise, the shape of the roller jacket 11 can be set in such a way that the

desired profile of the line force in the gap 5 is maintained. A zonewise regulation of the support elements 14, in contrast, allows a correction of the pressing profile brought about by the pressing device 10. Here, both functions can be optimally carried out here independently of each other.

In the embodiment according to Figure 2, reference numerals increased by 100 are employed in order to designate the corresponding parts. As the calander 101, a super calander is employed with a stack of rollers 115 arranged above each other, some of which have a soft covering and some of which are made of steel, and also with deflection rollers 116. The lowermost roller is a fixed roller which is configured as a carrier drum 103. The wound lap 108 created on a cylinder 109 is mounted on a lever 117 that is under the influence of a pressing device 110. In this manner, the wound lap 108 is pressed with a predefined force against the carrier drum 103. Once the wound lap has increased in size so as to reach the circumference 108', the lever 117 moves to the position 117', during which the contact pressure of the pressing device 110 is retained. Here, too, the carrier drum 103 is configured as a bending-setting roller. A first row of support elements 113 acts in the direction of the roller gap 105 while a second row of support elements 114 acts in the direction of the wound lap 108.

In the embodiment according to Figure 3, the reference numerals are increased by 200 in order to designate the corresponding parts. Here, a horizontal calander 201 is provided in which the lap 208 wound up on the cylinder 209 is in contact with the carrier drum 203 on one side while the adjacent calander roller 215 is in contact with the carrier drum 203 on the other side. It is additionally provided that the carrier drum is driven by a motor 218 while the cylinder is driven by a motor 219. The speeds of both motors are set in such a way that the rotational speed of the wound lap 208 is somewhat higher than the rotational speed of the carrier drum 203, as a result of which a certain tension is exerted on the sheet of material 206, which yields a tight wound lap. Incidentally, as in the preceding embodiments, the cylinder 209 is provided with a pressing device not shown here.

In this embodiment, the space above the carrier drum 203 is free, and consequently, a new cylinder 209a can be put in place by means of a crane so that, when the wound lap

**208** is finished, it can be gradually lowered onto the guide **220** for the cylinder **209** while the following sheet section is wrapped around.

In the embodiment according to Figure 4, the reference numerals are increased by 300 in order to designate the corresponding parts. The calander **301** has a carrier drum **303** as well as two calander rollers **315**, **315a** which can be pressed along their circumference. These can be configured as deflection-setting rollers and have corresponding support elements **321**. Therefore, the material sheet **306** is treated in two gaps **305**, **305a** before it is wound up onto the wound lap **306**.

In the embodiment according to Figure 5, the reference numerals are increased by 400 in order to designate the corresponding parts. The calander **401** has a carrier drum **403** which, together with additional calander rollers **415**, forms a stack. The outermost roller is provided with hydrostatic support elements **421**. This is where the sheet of material **406** passes through three gaps **405**, **405a** and **405b** before it is wound up onto the wound lap **408**.

All of these cases entail the great advantage that the space requirements are much less than has been the case so far and the elimination of one roller translates into cost savings. Moreover, it can be seen that the free sheet material length between the last calander gap and the starting point on the wound lap is very short.

The carrier drum can also be formed by types of rollers other than the ones depicted, for instance, by a heated or cooled roller having peripheral lengthwise bores through which the heat carrier passes, of the type employed in compact calanders. A chain drive equipped with a hydraulic or electric motor can also be used as the pressing device.

**Patent Claims**

1. A calander comprising a fixed roller and at least one more roller for purposes of treating a sheet of material as well as a winder located downstream therefrom, which has a carrier drum for a wound lap to be wound onto a cylinder, **characterized in that** the fixed roller of the calander (1; 101; 201, 301; 401) is formed by the carrier drum (3; 103; 203; 303; 403).
  
2. The calander according to Claim 1, characterized in that the carrier drum (103; 403) is arranged at the end of a calander roller stack.
  
3. The calander according to Claim 1, characterized in that the carrier drum (3) forms one of the two rollers (3, 4) of a compact calander (1).
  
4. The calander according to Claim 1, characterized in that the carrier drum (303), forms a gap (305, 305a) with each of at least two rollers (315, 315a) arranged offset on the circumference.
  
5. The calander according to one of Claims 1 to 4, characterized in that the cylinder (9; 109; 209; 309; 409) is arranged at the side of the calander (1; 101; 201, 301; 401).

6. The calander according to one of Claims 1 to 5, characterized in that the calander roller (215) that interacts with the carrier drum (203) is arranged at the side of the carrier drum that lies opposite from the cylinder (209).
7. The calander according to one of Claims 1 to 5, characterized in that the calander roller (4; 104) that interacts with the carrier drum (3; 103) is positioned on the carrier drum in such a way that it is offset by about 90° with respect to the cylinder (9; 109).
8. The calander according to one of Claims 1 to 7, characterized in that the carrier drum (3; 103) is a bending-setting roller.
9. The calander according to one of Claims 1 to 8, characterized in that the bending-setting roller has two rows of hydrostatic support elements (13, 14; 113, 114), one of which faces the cylinder (9; 109) while the other faces the adjacent calander roller (4; 104).
10. The calander according to one of Claims 1 to 9, characterized in that the wound lap (8; 108) can be pressed against the carrier drum (3; 103) by means of a pressing device 10; 110).

11. The calander according to one of Claims 1 to 10, characterized in that the cylinder (209) has its own drive (219) that keeps the rotational speed of the wound lap (208) somewhat higher than the rotational speed of the carrier drum (203).
  
12. The calander according to one of Claims 1 to 11, characterized in that an expander roller (7; 107) is arranged between the last calander gap (5; 105) and the starting point of the sheet (6; 106) onto the wound lap (8; 108).

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2 page of appertaining drawings

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Translation: Language Solutions  
  
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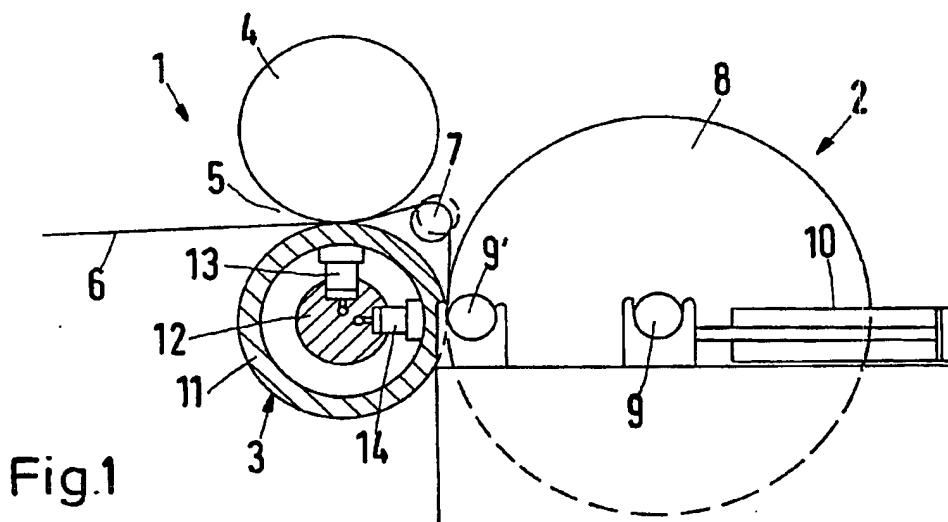


Fig.1

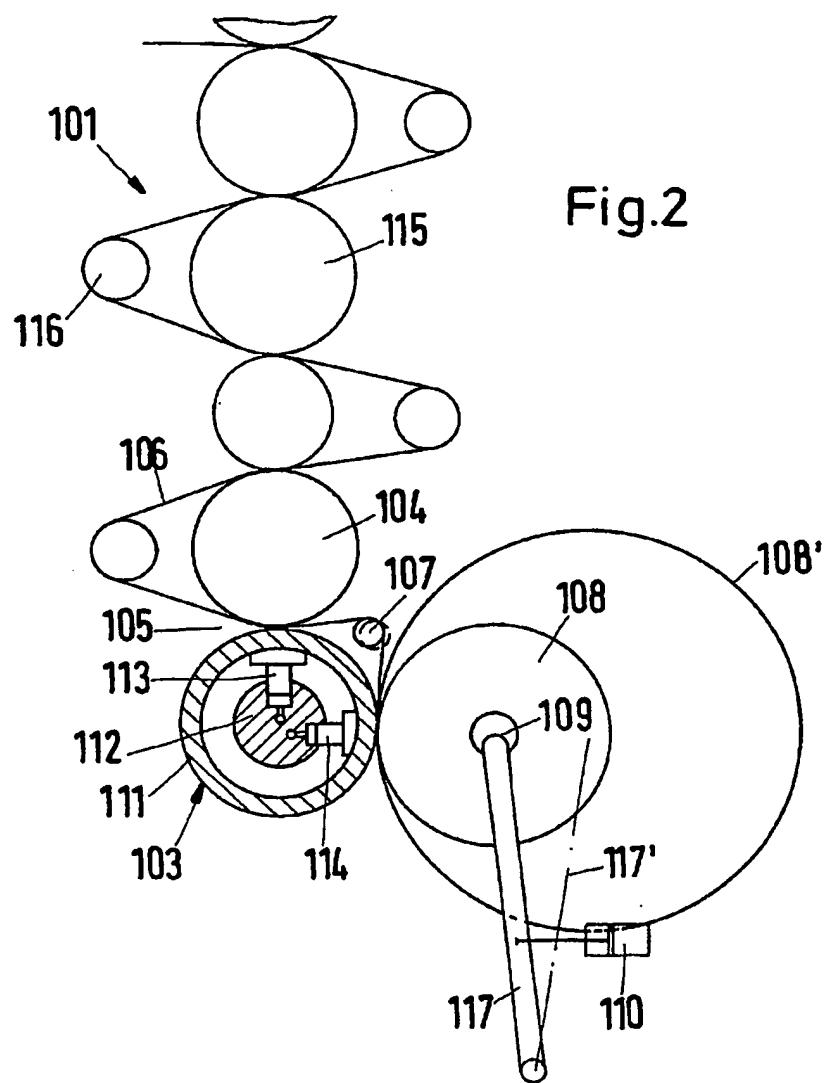


Fig.2

Fig.3

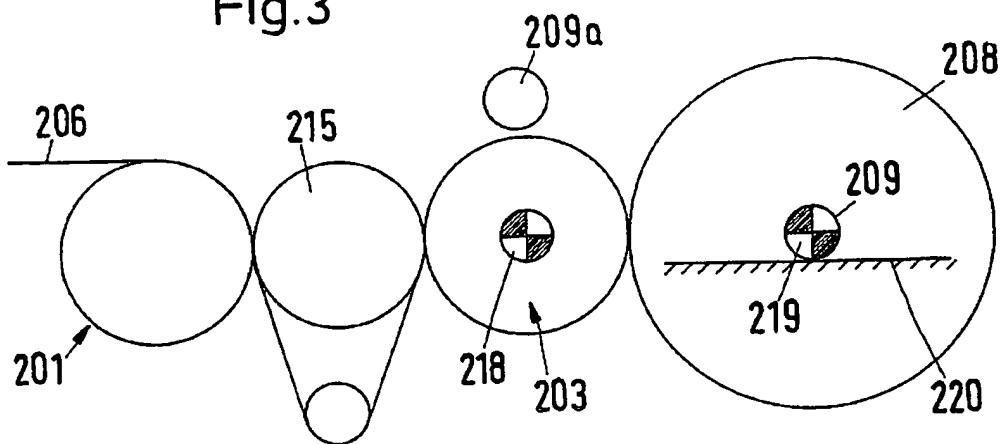


Fig.4

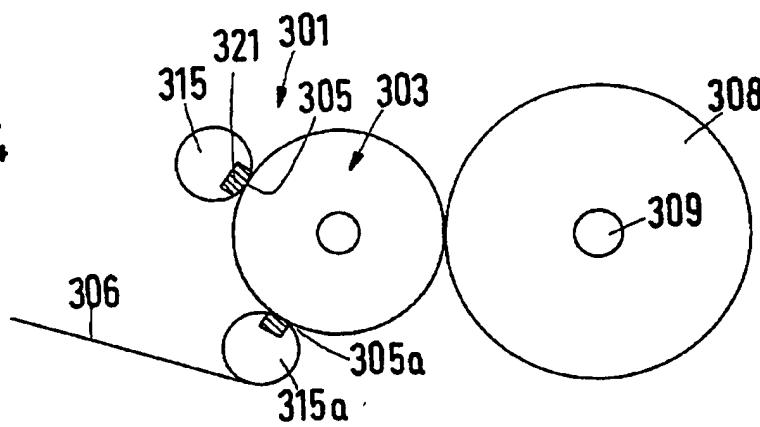


Fig.5

